

WHAT IS CLAIMED IS:

1 1. A quick-release joint for two tubes, the quick-release joint comprising:

2 a hollow cylindrical first connector adapted to securely connect to a first tube,

3 the first connector having an inner lip formed on an inner surface of the first connector;

4 a hollow cylindrical second connector adapted to securely connect to a second

5 tube, wherein the second connector is pivotally connected to the first connector and is

6 axially offset from the first connector, the second connector has a protrusion formed on

7 an inner surface of the second connector and having an outer groove formed on the

8 protrusion next to the top surface of the second connector to correspond to the inner lip;

9 and

10 a retainer formed on a side of the first connector and the second connector to

11 move the first connector to axially align with the second connector such that the inner

12 lip is received in the outer groove of the protrusion to secure connection between the

13 first connector and the second connector.

14 2. The quick-release joint as claimed in claim 1, wherein the first connector has

15 a sleeve formed on a side of the first connector, the second connector has a pair of ears

16 separated from each other by a distance larger than a length of the sleeve so that the

17 sleeve is slidable between the pair of ears.

18 3. The quick-release joint as claimed in claim 2 further comprising a pin

19 extending through the sleeve and the pair of ears to secure the sleeve between the pair of

20 ears and a first spring mounted around the pin and sandwiched between the sleeve and

21 one of the ears to urge the first connector to be axially offset from the second connector.

22 4. The quick-release joint as claimed in claim 1, wherein the retainer comprises

23 a push securely engaged with an outer side surface of the first connector, a bolt with a

1 first distal end extending into the second connector to securely connect to an inner
2 surface of the second connector and a handle rotatable relative to the push and having a
3 second distal end of the bolt rotatably received by a rotating axle inside the handle, the
4 handle having an eccentric cammed head selectively engaging with a concave outer
5 surface of the push so as to push the first connector to axially align with the second
6 connector.

7 5. The quick-release joint as claimed in claim 3, wherein the retainer comprises
8 a push securely engaged with an outer side surface of the first connector, a bolt with a
9 first distal end extending into the second connector to securely connect to an inner
10 surface of the second connector and a handle rotatable relative to the push and having a
11 second distal end of the bolt rotatably received inside the handle, the handle having an
12 elliptical head selectively engaging with an outer surface of the push so as to push the
13 first connector to align with the second connector.

14 6. The quick-release joint as claimed in claim 5, wherein the retainer further has
15 a second spring sandwiched between an outer surface of the second connector and an
16 inner surface of the push to provide a recovery force to the push and handle after the
17 elliptical head of the handle engages with the outer surface of the push.

18 7. The quick-release joint as claimed in claim 6, wherein the first connector has
19 a recessed area formed on the outer surface of the first connector to receive therein one
20 portion of the push and the second connector has another recessed area formed on an
21 outer surface of the second connector to receive therein the other one portion of the
22 push.

23 8. The quick-release joint as claimed in claim 7, wherein the outer surface of the
24 push is concave and the inner surface of the push is convex.

1 9. In a quick-release joint for two tubes, the quick-release joint having a first
2 connector adapted to securely connect to a first tube, the first connector having a first
3 inner lip formed on an inner surface of the first connector;
4 a second connector adapted to securely connect to a second tube, wherein the
5 second connector is pivotally connected to the first connector and is axially offset from
6 the first connector, the second connector has a protrusion formed on an inner surface of
7 the second connector and having an outer groove formed on the protrusion next to a top
8 face of the second connector to correspond to the first inner lip; and
9 a retainer formed on a side of the first connector and the second connector to
10 move the first connector to align with the second connector such that the first inner lip is
11 received in the outer groove of the protrusion to secure connection between the first
12 connector and the second connector, wherein the improvements comprise:
13 the retainer includes a first arm, a second arm, a cylindrical connector and a
14 threaded bolt,
15 wherein the first arm is securely connected to an outer surface of the first
16 connector and has a tubular connector integrally formed with the first arm, the second
17 arm is securely connected to an outer surface of the second connector, the threaded bolt
18 extends through the cylindrical connector to be ready to abut an inner surface of the
19 second connector,
20 whereby before the extension of the threaded bolt, the first connector is mis-
21 aligned with the second connector,
22 after the threaded bolt threadingly extends further into the cylindrical connector
23 to abut the inner surface of the second connector, the second connector is moved by the
24 extension of the threaded bolt to axially align with the first connector.

1 10. The quick-release joint for two tubes, the quick-release joint comprising:

2 a hollow, cylindrical first connector having a first protrusion formed and
3 extending from a portion of an inner periphery of the first connector, a first groove
4 defined at a joint of the first protrusion and the inner periphery of the first connector, a
5 guide formed on an outer face of the first protrusion and securely engaged with the
6 bottom face of the first connector and a first passage defined in the inner periphery of the
7 first connector (40);

8 a hollow, cylindrical second connector having a second protrusion formed and
9 extending upward from a portion of an inner face of the second connector, a second
10 groove defined at a joint of the second protrusion and the inner face of the second
11 connector to correspond to the first passage, a guiding notch defined in a bottom face of
12 the second connector to correspond to the guide and a second passage defined in the
13 inner face of the second connector to correspond to the first groove of the first connector;
14 and

15 a push having a knob and a bolt having a first distal end securely connected to
16 the knob and a second distal end extending into the second protrusion from an outer
17 periphery of the second protrusion, such that after the first protrusion is extended into
18 the second connector where an open space is defined, the knob is rotated to further
19 extend the bolt into the second connector so that the second distal end of the bolt abuts
20 an outer periphery of the first connector to push the mating between the first groove and
21 the second passage and the mating between the second groove and the first passage.

22 11. The joint as claimed in claim 10, wherein in order to ensure the mating
23 between the first groove and the second passage and the mating between the second
24 groove and the first passage, the guide is moved along the guiding notch.